

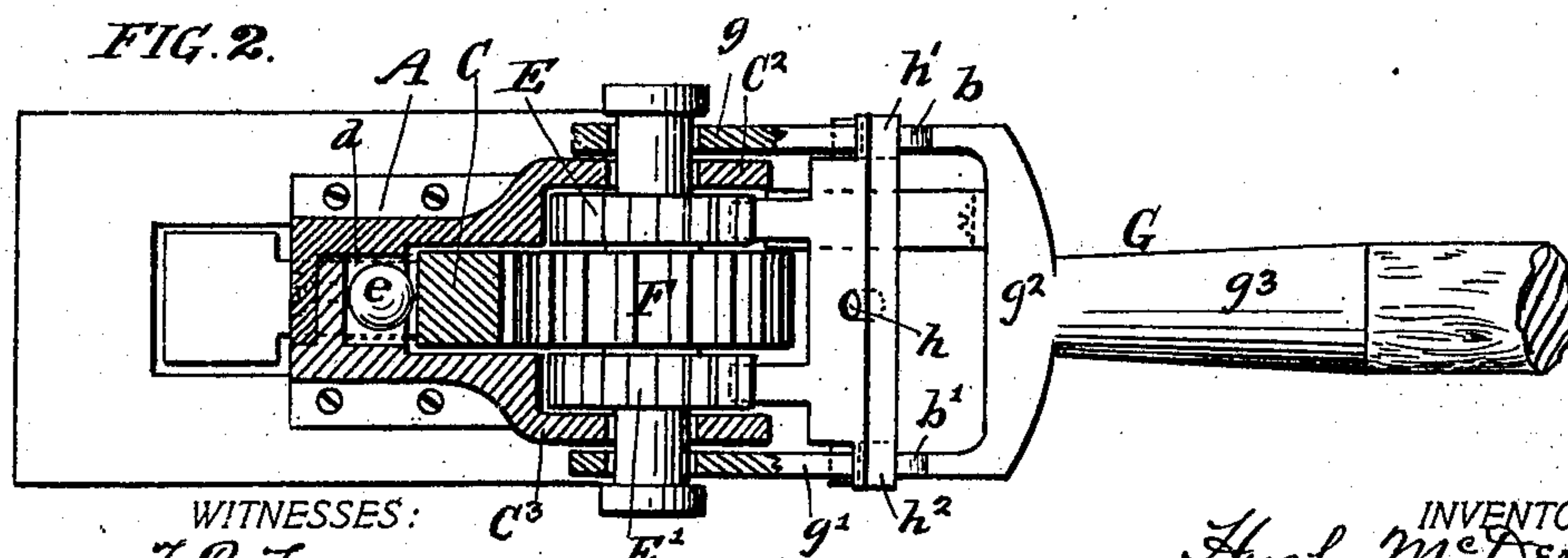
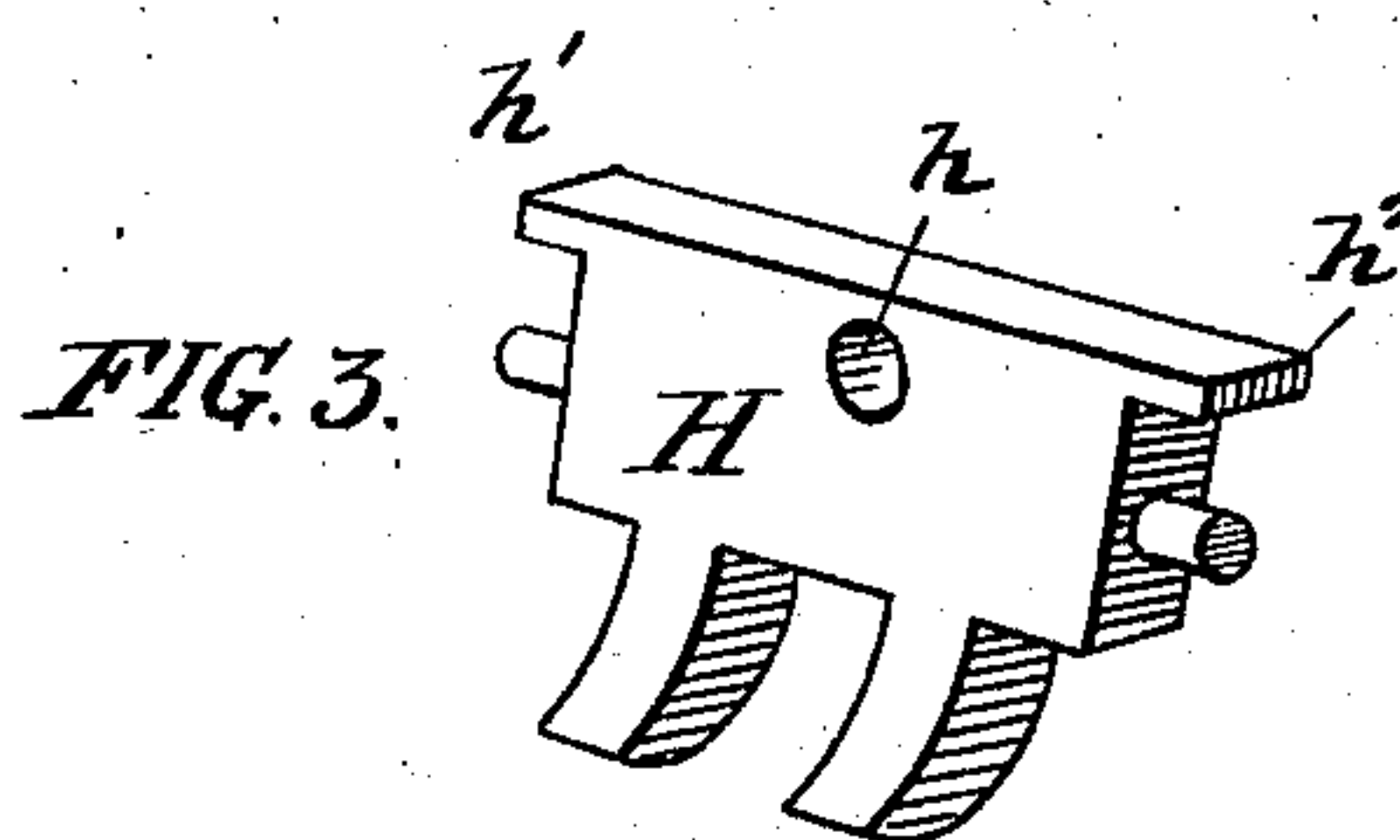
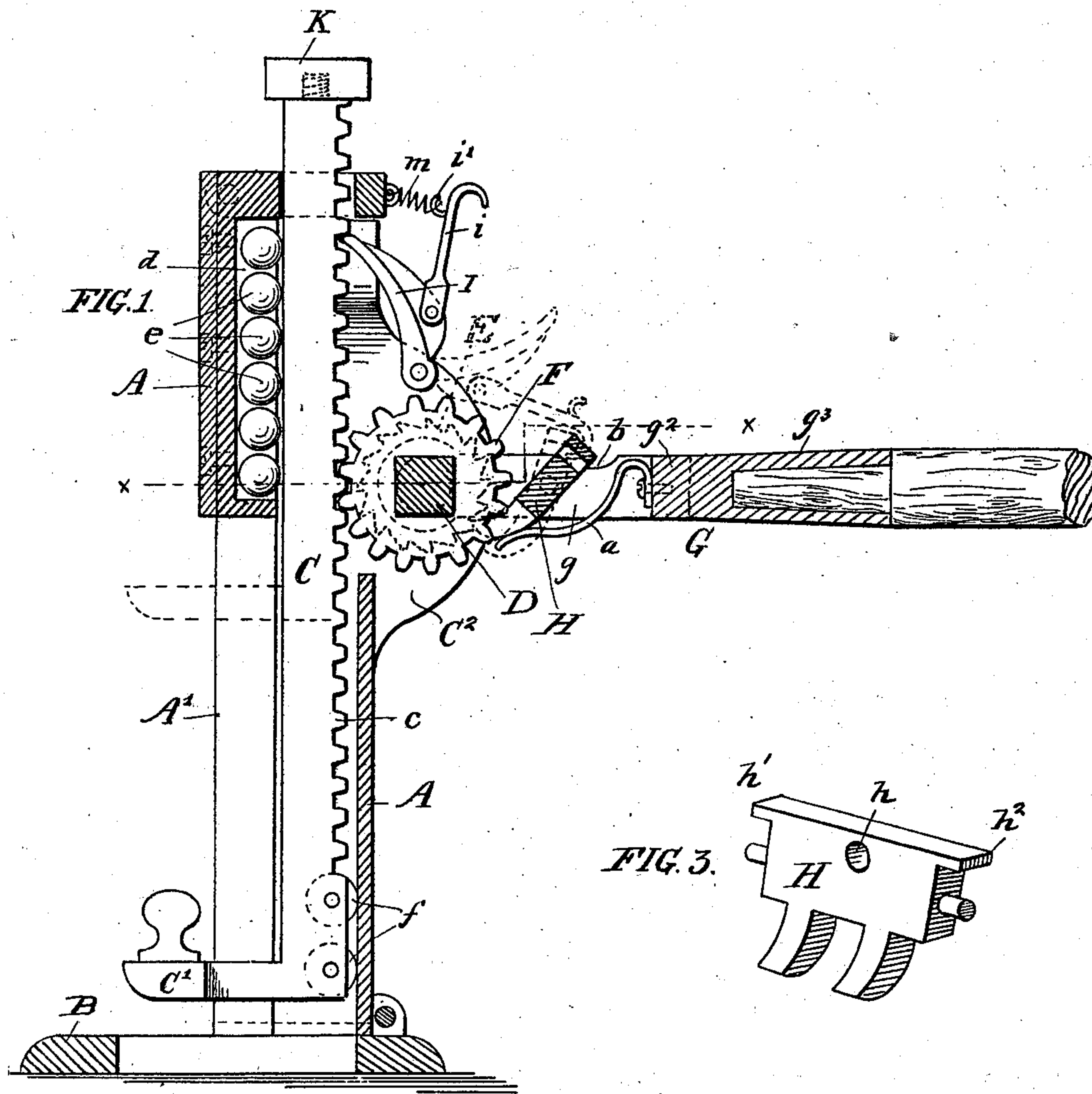
No. 692,536.

Patented Feb. 4, 1902.

H. McDERMID.  
LIFTING JACK.

(Application filed Dec. 14, 1900.)

(No Model.)



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

HUGH McDERMID, OF CHICAGO, ILLINOIS.

## LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 692,536, dated February 4, 1902.

Application filed December 14, 1900. Serial No. 39,872. (No model.)

*To all whom it may concern:*

Be it known that I, HUGH McDERMID, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lifting-Jacks, of which the following is a specification.

My invention relates to lifting-jacks, the same being designed more particularly for use on railways for lifting tracks, cars, and other heavy objects; but its utility is by no means limited to such applications; and the principal object of my invention is to provide a simplified and improved mechanism for operating the vertical lifter-bar.

To this and other ends my invention consists in the parts and combinations of parts, as hereinafter more particularly described, and pointed out in the claims.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a view in central vertical section of my improved lifting-jack. Fig. 2 is a plan view, partly in horizontal section, on the line  $x x$  of Fig. 1; and Fig. 3 is a detail of the double pawl.

Proceeding to a detailed description, A designates the main frame or casing of the jack, resting on and secured to a base-plate B. This frame or casing may conveniently be formed of a pair of parallel vertical standards, grooved and hollowed out on their opposing faces to form suitable guides for the lifter-bar C and its antifriction-bearings and securely clamped or riveted together in any suitable manner, as shown. The front face of the casing A is slotted through a portion of its length, as at A', to permit the play therethrough of the foot C' of the lifter-bar, and to the rear of the casing A are integrally or otherwise secured a pair of rearwardly-extending brackets C<sup>2</sup> C<sup>3</sup>, between which is mounted and housed a portion of the lifter-bar-operating mechanism, as hereinafter more fully described.

D is a square shaft or spindle rotatably journaled between the two brackets C<sup>2</sup> C<sup>3</sup> and having fixedly secured thereon a pair of ratchet-wheels E E' and between the latter a gear-wheel F. This gear F is constantly in engagement with a toothed rack c, formed on the rear side of the lifter-bar C and extending almost the entire length of the latter.

Loosely mounted on the rounded ends of the shaft D is a forked lever, designated as a whole by G and comprising a pair of parallel arms  $g g'$ , rigidly united at one end by a cross-bar  $g^2$ , from the center of which latter extends a handle-socket  $g^3$ , in which a long wooden handle is designed to be fitted. Journaled in and between the arms  $g g'$  of the forked lever is a double pawl H, the two noses of which are normally kept pressed in engagement with the ratchets E E' by a spring  $a$  in the manner plainly shown in the drawings. The rearwardly-extending shank of the pawl has a hole  $h$  formed therethrough for a purpose hereinafter explained, and its two ends are extended at  $h' h^2$  to engage recesses  $b b'$ , cut in the upper edge of the arms  $g g'$  for a purpose hereinafter disclosed.

Pivoted between the brackets C<sup>2</sup> C<sup>3</sup>, above the shaft D, is a pawl I, the nose of which normally engages the teeth of the rack  $c$  on the lifter-bar to hold the latter in the position to which it has been raised by each successive power-stroke of the operating mechanism. Pivoted on the back of this pawl I is a hooked link  $i$ , which at a certain point in the operation of the device is designed to engage the shank of the double pawl H, preferably in the hole  $h$  therein. The pawl I is yieldingly held in engagement with the rack  $c$  by any suitable means, as a spring  $m$ , the free end of which removably engages a hook  $i'$  on the back of the hooked link  $i$ .

Owing to the immense strain to which the lifter-bar is subjected in jacks of this character and to the fact that the power is applied to the rear of the bar, while the resistance or load is usually applied to its front, (on the foot,) the front and rear faces of the lifter-bar engage their guides in the casing A with great friction and consequent wear upon the parts. How to best overcome this friction and consequent wear has been a matter of much study and experiment with me, and I will now describe the means which I prefer to employ for this purpose. In the upper front part of the casing A and directly in advance of the front face of the lifter-bar C is formed a vertical race  $d$ , which is filled with a series of hardened-steel balls  $e$  of the proper diameter to just engage the face of the lifter-bar, while in the heel of the lifter-



bar itself I journal one or more (preferably a series) of hardened-steel rollers *f*, which engage the rear lower wall of the casing A. It will thus be seen that I provide anti-friction-bearings of considerable length on both the front and rear faces of the lifter-bar.

In order to keep the lifter-bar from dropping out of the casing through the slotted base-plate B when at work, as well as to permit the removal of the lifter-bar in that manner when desired for repairs or for any other reason, the upper end of the lifter-bar may be provided with a removable screw-threaded cap K, which may have a broad flat top for the purpose of engaging an object too high to be conveniently engaged by the foot C'.

The operation of my improved jack in lifting a load will be readily understood. The foot or cap (as the case may be) of the lifter-bar having been secured beneath the object to be raised, the handle of the forked lever G is worked up and down. At every downstroke the noses of the double pawl H engage the teeth of the ratchet-wheels E E', thereby turning the shaft D and the gear-wheel F, and, through the engagement of the latter with the rack *c*, raising the lifter-bar and its engaged load through a small distance. The spring *m* keeps the pawl I in constant engagement with the teeth of the rack *c*, whereby the lifter-bar C and its load are sustained in their raised positions each time the handle of the forked lever G is being raised preparatory to another power-stroke. During these strokes the front and rear faces of the lifter-bar undergo a rolling rather than a sliding contact with their guides in the casing A, owing to the presence of the balls *e* and rollers *f*, thus greatly diminishing the friction and wear on these coöperating parts. When the load has been lifted the desired height and secured there, the spring *m* is disengaged from the hook *i*' and the hooked link *i* is allowed, on the next upward movement of the forked lever G to drop into engagement with the hole *h* in the shank of the double pawl H. The following downstroke of the forked lever G thereupon withdraws the pawl I through the hook *i* from engagement with the rack *c*, and at the same time the double pawl H is by the hook *i* withdrawn from engagement with the ratchets E E', as shown in dotted lines in Fig. 1, thus leaving the lifter-bar C free to descend by its own weight to its lowest position, whereupon the above-described operation may be repeated. During the downward or power strokes of the lever G there is obviously an enormous strain upon the journals of the double pawl H. This strain is partly relieved and any tendency of the pawl to "buckle" is prevented by the engagement of the projections *h'* *h*<sup>2</sup> with the cut-outs *b* *b'* of the lever-arms *g* *g'*.

Although I prefer to use a pair of ratchet-wheels and a double pawl, as hereinabove described, nevertheless it is manifest that in some cases a single ratchet-wheel and a single pawl might be sufficient, and hence I do not

wish to be understood as limiting myself to the double construction (except where specifically recited) in combination with the other elements of my device.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lifting-jack, the combination with the casing and the lifter-bar guided to slide vertically therein, of a rack formed on the rear face of the lifter-bar, a pair of brackets secured to the casing, a shaft journaled in said brackets, a gear fast on said shaft and engaging said rack on the lifter-bar, a ratchet-wheel also fast on said shaft, a lever loosely mounted on said shaft, a spring-pressed pawl journaled in said lever and normally engaging said ratchet-wheel, a pawl journaled between said brackets and normally engaging the teeth of the rack on the lifter-bar to keep the latter elevated, and separable connections between the two pawls whereby, when they are connected, a downward stroke of the lever withdraws the last-named pawl from the rack and simultaneously withdraws the first-named pawl from its ratchet-wheel, substantially as described.

2. In a lifting-jack, the combination with the casing and the lifter-bar guided to slide vertically therein, of a rack formed on the rear face of the lifter-bar, a pair of brackets secured to the casing, a shaft journaled in said brackets, a gear fast on said shaft and engaging said rack on the lifter-bar, a pair of ratchet-wheels also fast on said shaft, one on either side of said gear, a forked lever loosely mounted on said shaft, a spring-pressed double pawl journaled between the arms of said lever and normally engaging said ratchet-wheels, a spring-pressed pawl journaled between said brackets and normally engaging the teeth of the rack on the lifter-bar to keep the latter elevated, and separable connections between the two pawls whereby they may be simultaneously disengaged from their respective coöperating parts by a single downward stroke of the lever, thus allowing the lifter-bar to drop, substantially as described.

3. In a lifting-jack, the combination with the casing and the lifter-bar guided to slide vertically therein, of a rack formed on the rear face of the lifter-bar, a pair of brackets secured to the casing, a shaft journaled in said brackets, a gear fast on said shaft and engaging said rack on the lifter-bar, a pair of ratchet-wheels also fast on said shaft, one on either side of said gear, a forked lever loosely mounted on said shaft, a spring-pressed double pawl journaled between the arms of said lever and normally engaging said ratchet-wheels, a spring-pressed pawl journaled between said brackets and normally engaging the teeth of the rack on the lifter-bar to keep the latter elevated, and a hook pivoted in the back of said last-named pawl and adapted, when the lever is raised to a certain height, to drop over and engage the shank of said



first-named pawl, whereby, on the next downward stroke of the lever the two pawls are simultaneously disengaged from their respective cooperating parts, thus allowing the  
5 lifter-bar to drop, substantially as described.

4. In a pawl-and-ratchet operating mechanism for lifting-jacks and similar devices, the combination with a rotatable shaft having fast thereon a pair of ratchet-wheels and  
10 an intermediate power-transmitting wheel, of a forked operating-lever pivoted on the ends of said shaft, and a double pawl journaled between the arms of said forked lever and

normally engaging said ratchet-wheels, the shank of said pawl having projections which  
15 extend laterally over and engage the upper edges of the arms of said lever, substantially as and for the purposes described.

In testimony that I claim the foregoing as my invention I have hereunto signed my name  
20 in the presence of two witnesses.

HUGH McDERMID.

Witnesses:

SAMUEL N. POND,  
ADA H. BARNES.